

polymer. Accordingly, water-based inks comprising aqueous dispersions of polymer particles having good stability in the presence of a permeability controlling agent are sought.

The claimed invention addresses this problem by providing a water-based ink comprising an aqueous dispersion of polymer particles of a water-insoluble polymer having C₂₀₋₃₀ alkyl groups on its side chain and having an acid value of 30-120 mgKOH/g, and a hydrophobic dye. Applicant has discovered that such a water-insoluble polymer provides for a water-based ink of good stability. Such a water-based ink is nowhere disclosed or suggested in the cited prior art of record.

The rejection of claims 1-3 and 5-17 under 35 U.S.C. §103(a) over Gore et al., U.S. 2003/0055178 in view of Ishizuka et al. U.S. 2002/0025994 and WO 2001/96483 is respectfully traversed.

None of the cited references disclose or suggest improved stability by selection of a polymer particle of a water-insoluble polymer having an alkyl group of 20-30 carbon atoms in its side chain and having an acid value of 30-120 mg KOH/g.

Gore et al. describe dispersions in which the colorant is encapsulated within a polymer particle of polymerized ethyleneically-unsaturated monomers including, but not limited to: (meth)acrylic acid, (meth)acrylamides, alkyl (meth)acrylates, alkenyl (meth)acrylates, aromatic (meth)acrylates, vinyl aromatic monomers, phosphorus-containing compounds such as phosphoethyl (meth)acrylate ("PEM"), vinyl acetates, nitrogen-containing compounds and their thio-analogs, maleate, mono- and dialkyl esters, maleic acid, fumarates, maleamates and their copolymers with vinylaromatics, vinyl ethers, vinyl sulfides, and substituted ethylene monomers (paragraph [0034]). An acid number of 3-120 mg KOH/g is not disclosed.

As to the examples of the reference, example 1 uses methyl methacrylate a C₁ alkyl group side chain. Examples 2 and 3 use acetoacetoxyethyl and allyl methacrylates, C₆ and C₃

alkyl group side chains respectively. Example 4 uses ethyl and methyl methacrylates, C₂ and C₁ alkyl group side chains. The table in example 5 lists a number of PNP compositions identified in terms of monomer abbreviations, none of which contain CEMA or SMA, the only C₁₆₋₂₄ alkyl(meth)acrylates identified by Gore by abbreviation in paragraph [0038].

None of the other examples illustrate a C₁₆₋₂₄ acrylate.

Thus, Gore et al. only provides a generic disclosure of the use of C₁₋₂₄ alkyl (meth)acrylates in the absence of an acid number a claimed.

Applicant has demonstrated an improvement in printing performance and retention of viscosity by selection of an alkyl group having 20-30 carbon atoms, as compared with C₁₂, C₁ and C₂ polymers, comparisons which are closer to the claimed invention than illustrated by the cited references. The examiner's attention is again directed to the data appearing in Tables 1-3 on page 26 of the above-identified application. Comparative examples 1 and 4 are demonstrations of C₁₂ polymers **having an acid number as claimed**, comparative examples 2 and 5 are demonstrations of C₂ polymers **having an acid number as claimed** and comparative examples 3 and 6 are demonstrations of C₁ polymers. Examples 1 and 2 are a demonstration of a C₂₂ polymer. The advisory action of March 23, 2007 questioned the acid number of the polymer of examples 1 and 2 which as been identified as 65.1, within the claimed range of 30-120 mg KOH/g. The acid values of the comparative preparation examples 1-3 has also been identified and is summarized below. For the examiner's convenience the data from tables 1-3 is reproduced below:

Table 1

	Optical Density	Acid Value	Printing Reliability
Example 1C ₂₂	1.06	65.1	No clogging and no distortion observed
Comparative example 1 C ₁₂	1.05	38.9	No clogging but slight distortion
Comparative example 2 C ₂	1.03	57.1	No clogging but slight distortion
Comparative example 3 C ₁	1.01	213	No clogging but slight distortion

Table 2

Example no	Acid number	Ratio of Retaining Viscosity (%)				
		Isopropanol	2-Pyrrolidinone	Diethylene Glycol Monobutyl Ether	Triethylene Glycol Monobutyl Ether	Acetylenol EH
2	65.1	98	103	104	100	100
Comp. Ex 4	38.9	125	124	126	136	123
Comp. Ex 5	57.1	129	120	125	120	129
Comp. Ex 6	213	132	133	128	130	128

Table 3

Example no	Acid number	Ratio of Retaining Average Particle Diameter (%)				
		Isopropanol	2-Pyrrolidinone	Diethylene Glycol Monobutyl Ether	Triethylene Glycol Monobutyl Ether	Acetylenol EH
2	65.1	99	102	99	97	104
Comp. Ex 4	38.9	125	142	128	142	127
Comp. Ex 5	57.1	121	136	127	115	120
Comp. Ex 6	213	132	146	129	121	124

The data illustrates an improved printing reliability in terms of no observed distortion and retention of viscosity and average particle diameter for the C₂₂ alkyl polymer as compared with C₁₂, C₁ and C₂ polymers. As the primary references only broadly suggest an alkyl group of C₁₋₂₄ alkyl ((page 3, paragraph [0035] of Gore et al), there is no expectation of

any different result from selection of a C₂₀₋₃₀ alkyl group. As applicant has demonstrated differences in performance resulting from such a selection, the claimed invention is believed to be non-obvious over the cited references.

Further more, applicant's comparison of C₂₂ alkyl polymer as compared with C₁₂, C₁ and C₂ polymers is a comparison against the closest prior art of record for the reasons as follows:

Gore et al generically describes C₁₋₂₄ alkyl acrylates. There is no disclosure of an acid number of from 30-120. Example 1 is of methyl methacrylate. Examples 2 and 3 are of acetoacetoxyethyl methacryalte and allyl methacrylate. Example 4 is of ethyl acrylate and methyl methacryalte. The longest chain examples in example 5, Table 5.1 are butyl acrylate (BA)and 2-ethylhexyl acryalte (EHA). Thus, none of the examples are closer than applicants' comparison against a C₁₂ acrylate having an acid number of 38.9. There is nothing in the cite reference which is closer to the claimed invention of C₂₀₋₃₀, than the C₁₂ acryalte having an acid number of 38.9 which has been compared against.

Further more, applicant is not required to compared the claimed invention against prior art which does not exist in the prior art (*In re Geiger* 815 F.2d 686,689, 2 USPQ2d 1276, 1279 (Fed. Cir. 1987).

Requiring applicant to compare claimed invention with polymer suggested by the combination of references relied upon in the rejection of the claimed invention under 35 U.S.C. 103 'would be requiring comparison of the result with the invention with the results of the invention' *In re Chapman*, 357 F.2d 418, 422, 148 USPQ 711, 714 (CCPA (1966)

An example of a C₁₆ acrylate having an acid number of from 30-120 does not exist in the cited prior art. As applicant has compared against an example which is closer to the claimed invention than that disclosed in the reference, applicant's comparison is sufficient.

Withdrawal of the rejection based on obviousness is respectfully requested.

The remaining cited references fail to cure the defects of the primary reference in terms of disclosing embodiments which are closer prior art.

Yatake et al. in paragraphs [0152]-[0153] of U.S. 2003/0103462 merely describes the use of polymers of monomers including acryloyl, methacryloyl, vinyl or allyl groups and fails to provide a closer suggestion than Gore et al. of a water-insoluble polymer having an alkyl group of at least 20-30 carbon atoms on its side chain and an acid value of 30-120 mgKOH/g and a hydrophobic dye.

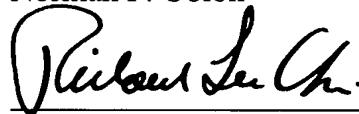
Ishizuka et al. describes in paragraph [0010] a polymer based on a polymerizable carboxylic acid monomer and fails to provide a closer suggestion than Gore et al. of a water-insoluble polymer having an alkyl group of at least 20-30 carbon atoms on its side chain and an acid value of 30-120 mgKOH/g and a hydrophobic dye.

As applicant has provided a comparison against the closest prior art of record of an improved stability resulting from selection of a C₂₀₋₃₀ alkyl group, the claimed invention is clearly not rendered obvious from this combination of references and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Applicant submits that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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